Antimicrobial activity of different extracts of five plants

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INTRODUCTION

Since many years, several plants have been used in order to control microbial infections. In this study was designed to screen aqueous, methanol and chloroform extracts of *Eryngium comosum*,[1,2] *Commelina cœlestis*,[2] *Salpianthus arenarius*, *Schefflera octophylla*[3] and *Drymaria glandulosa*[4] with the purpouse of finding those which have the capacity to inhibit microbial growth *in vitro*.

MATERIAL AND METHODS

Biological material. Plant material was collected in the Mexico valley and the Guerrero State, Mexico. The plants were authenticated by Biol. Aurora Chimal, a voucher specimen of each plant were deposited in the herbarium of the Universidad Autónoma Metropolitana-Xochimilco.

Aqueous extract. In a 500 ml round flask fitted with a reflux condenser, 30 g of the dried plant and 200 ml of water were heated and reflujed for 2 h, cooled to room temperature and decanted, the water was removed from the extract by evaporation under vacuum in a rotavapor.

Chloroform and methanol extracts. The same procedure was followed as for aqueous extract.

Antimicrobial screening. Nutrient media was prepared according to manufacturer instructions (Agar BHI) and sterilized for 20 min at 121 °C. The following micro-organisms were used for this test : (I) *Staphylococcus aureus*, (II) *Proteus vulgaris*, (III) *Escherichia coli*, (IV) *Sarcina lutea*. The micro-organisms were cultured for 24 h at 37 °C in BHI.

Each culture was diluted with sterile 0.9% saline solution to give a suspension of about 10^7 microorganisms per ml. An amount of 0.1 ml of this suspension was spread on the test plate and 2.5 mg of each extract were placed on a blanck disc.[5] All determinations were made at least five times. A positive control with streptomycin (Sigma) was used (1 mg). Inhibition zones were read 1 day after incubation at 37 °C.

RESULTS

The antimicrobial effects of the plants are summarized in table 1, 2 and 3.

Table 1
Chloroform extracts tested for antimicrobial effects

Species	Extract yield (%)	Antimicrobial activity inhibition zone (mm)			
		I	II	III	IV
Eryngium comosum[3]	8	4	–	–	–
Commellina cœlestis[5]	2	–	–	–	–
Salpianthus arenarius	3.1	–	–	–	–
Schefflera octophylla	2.8	–	–	–	–
Drymaria glandulosa	3.4	–	–	–	–
Streptomycin	1.0	8.75	9.75	9.75	5.25

(I) *S. aureus*; (II) *P. vulgaris*; (III) *E. coli*; (IV) *S. lutea.*

Table 2
Methanol extracts tested for antimicrobial effects

Species	Extract yield (%)	Antimicrobial activity inhibition zone (mm)			
		I	II	III	IV
Eryngium comosum[3]	15	–	–	–	–
Commellina cœlestis[5]	19.3	–	–	–	–
Salpianthus arenarius	11.2	–	–	–	–
Schefflera octophylla	14.9	0.9	–	–	4.0
Drymaria glandulosa	18.6	–	–	–	–
Streptomycin	1.0	8.75	9.75	9.75	5.25

(I) *S. aureus*; (II) *P. vulgaris*; (III) *E. coli*; (IV) *S. lutea.*

Table 3
Aqueous extracts tested for antimicrobial effects

Species	Extract yield (%)	Antimicrobial activity inhibition zone (mm)			
		I	II	III	IV
Eryngium comosum[3]	21	5.5	–	–	–
Commellina cœlestis[5]	26.5	–	–	–	–
Salpianthus arenarius	19.7	–	–	–	–
Schefflera octophylla	16.75	3.75	–	–	4.75
Drymaria glandulosa	21.2	–	–	–	–
Streptomycin	1.0	8.75	9.75	9.75	5.25

(I) *S. aureus*; (II) *P. vulgaris*; (III) *E. coli*; (IV) *S. lutea.*

DISCUSSION

Of the 5 plants sample tested, only the methanol and aqueous extracts of *S. octophylla*, showed activity against Gram positive (*S. aureus* and *S. lutea*) and the chloroform, methanol and aqueous extracts of *E. comosum* against *S. aureus*. None of the extracts of *C. cœlestis*, *S. arenarius* or *D. glandulosa* showed any activity against the microorganisms at concentration used. Any extracts of the plants tested had antimicrobial activity against Gram-negative. Plants showing antimicrobial activity in this screening will further be examined for their active ingredients.

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Antibacterial properties of cajuput oil

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ABSTRACT

(The paper was presented by Vladimir er y)

Cajuput oil is obtained by hydrodistillation of leaves from the trees *Melaleuca cajuputi* Powell, syn. *Melaleuca minor* Sm. (family *Myrtaceæ*). The current production of cajuput oil in Vietnam exceed 100 tons per year and is mostly destined for the home market. Cajuput oil have been used for longer by traditional healers in Vietnam, Indonesia and China for treatment of purulent skin lesions and as an inhalent in the treatment of nasal catarrh with satisfactory results. The isolation of 1,8-cineole, /-/-linalool, /-/oC-terpineol and /-/-terpinen-4-ol was performed by column chromatography of the most suitable distillation ractions on silica gel (deactivated with 11% water) using light petroleum-ether mixtures of different concentrations. Recently cajuput oil has also been used as adjuvant for the treatment of osteomyelitis with very favorable results. We have determined susceptibility of the cajuput oil components by the measuring the diameters of the inhibition zones on Petri dishes. Reference strains of *Staphylococcus aureus*, *Escherichia coli* and *Pseudomonas æruginosa* and strains isolated from purulent lesions. In the qualitative tests carried out on 23 *Staphylococcus aureus* strains, l-B-cineole proved to be most potent compound, with average inhibition zones amounting to 16 mm, the other three substances appeared also affective. In the eleven strains of *E. coli* inhibition zone was found 15-16 mm in diameter. *Pseudomonas æruginosa* strains showed variable levels of inhibition. The most effective out of 4 above mentioned fractions were terpinen-4-ol and -terpineol. Satisfactory results were found in testing of the strains of *Candida albicans*, *Streptococcus* spp. A, B, C and G, *Enterobacter* spp., *Salmonella* spp. and *Klebsiella pneumoniæ*. According to our experience we can conclude, that the use of cajuput oil fractions for external treatment of purulent lesions is promising.

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